Tennessee

Background on Setting Fishing Advisories

EPA Institutional Control Roundtable

Dale Rector, DOE Oversight Division

April 4, 2006, Tucson AZ

Presentation Objectives

Orientation to Fishing Advisories

Factors to Consider

Examples of Contaminants

Examples of Advisories

Fishery Biology

Compensation (NRDA)

Watts Bar Reservoir in Tennessee

Orientation to Fishing Advisories

- “Advisory” provides information and recommendations to the public
- Identifies the fish, common names
- Identifies the water body, portion of it
- Identifies the pollutant
- Give advice on food preparation
- Particular advice to sensitive subgroups

Orientation Cont.

- Prohibitions on commercial fishing
- Basis can be on FDA limits (FDA only can enforce during interstate commerce)
- Or on EPA or State risk calculations
- States generally set advisories through the Water Quality Act delegation
- Often in effect for many years before pollutant sources are identified

Factors to Consider

- Identify the Fishery?
- Identify and Quantify the Contaminant?
- Commercial Fishery Contaminated Above FDA Limits?
- Sport Fishery Contaminated Above FDA Limits?
- Apply EPA/State Risk Based Formulas?

You Are Not In This Alone!

Final Version

YEAR 2004
303(d) LIST

April, 2005
(Previous version: September, 2004)

TENNESSEE DEPARTMENT OF ENVIRONMENT
AND CONSERVATION

Division of Water Pollution Control
Planning and Standards Section
6th Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1534

Final Version 2004 303(d) LIST (Upper Tennessee River Watershed cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority		Pollutant Source	COMMENTS
TN06010201 011 - 1000	PAINT ROCK CREEK	Roane	12.2	Escherichia coli	H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
TN06010201 013 - 0100	MUD CREEK	Loudon Monroe	7.2	Escherichia coli	H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
TN06010201 013 - 0200	GREASY BRANCH	Loudon Monroe	7.3	Escherichia coli	H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
TN06010201 013 – 1000	POND CREEK	Loudon Monroe	11.1	Nitrates Physical Substrate Habitat Alteration Escherichia coli	M M H	Pasture Grazing Livestock in Stream Animal Feeding Operations (NPS)	This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 013 – 2000	POND CREEK	Loudon Monroe	10.0	Nitrates Escherichia coli	M H	Pasture Grazing Livestock in Stream	Stream is Category 5. (One or more uses impaired.)
TN06010201 015 – 0100	BACON CREEK	Loudon Monroe	10.2	Escherichia coli	H	Pasture Grazing Animal Feeding Operations (NPS)	This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 015 - 1000	SWEETWATER CREEK	Loudon Monroe	29.3	Nitrates Loss of biological integrity due to siltation Escherichia coli	M H H	Municipal Point Source Discharge Channelization Pasture Grazing Land Development Animal Feeding Operation (NPS)	This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 020 - 1000	FORT LOUDOUN RESERVOIR	Knox Loudon	14600 ac	PCBs	L	Contaminated Sediment	Fishing advisory due to PCBs. Stream is Category 5. (One or more uses impaired.)
TN06010201 022 – 1000	GALLAGHER CREEK	Blount	13.2	Loss of biological integrity due to siltation	H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
TN06010201 026 – 0100	RODDY BRANCH	Blount Knox	6.4	Habitat loss due to alteration in stream-side or littoral vegetative cover Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	H M H H	Pasture Grazing Channelization Removal of Riparian Habitat	This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 026 – 0200	CANEY BRANCH	Blount	2.0	Physical Substrate Habitat Alteration	M	Sand, Gravel, Rock Mining or Quarries	Stream is Category 5. (One or more uses impaired.)
TN06010201 026 – 0300	HOLLYBROOK BRANCH	Blount	2.78	Habitat loss due to alteration in stream-side or littoral vegetative cover Loss of biological integrity due to siltation	H H	Pasture Grazing	This stream is Category 5. The stream is impaired for one or more uses.

Final Version 2004 303(d) LIST (Nolichucky River Watershed cont.)

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority	Pollutant Source	COMMENTS
TN06010108 DCTRIBS – 0500	MUD CREEK	Greene	21.4	Loss of biological integrity due to siltation M	Pasture Grazing Land Development	Stream is Category 5. (One or more uses impaired.)
TN06010108 DCTRIBS – 0600	FLAG BRANCH	Greene	5.8	Loss of biological integrity due to siltation M Habitat loss due to alteration in stream-side or littoral vegetative cover M	Pasture Grazing Channelization	Stream is Category 5. (One or more uses impaired.)

Upper Tennessee River Basin This basin contains the following USGS Hydrologic Unit Codes: 06010201 (Watts Bar Res., Fort Loudoun Res., and Little River).

Waterbody ID	Impacted Waterbody	County	Miles/Acres Impaired	CAUSE / TMDL Priority	Pollutant Source	COMMENTS
TN06010201 001 - 0100	WATTS BAR RESERVOIR (CLINCH RIVER ARM)	Roane	1,000 ac	Chlordane L Mercury L PCBs L	Industrial Point Source Discharge Contaminated sediments	Fishing advisory due to PCBs. This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 001 - 1000	WATTS BAR RESERVOIR	Rhea Roane Meigs	34075 ac	PCBs L	Contaminated sediments	Fishing advisory due to PCBs. This stream is Category 5. The stream is impaired for one or more uses.
TN06010201 001 – 2000	UPPER WATTS BAR RESERVOIR Sweetwater Creek to Fort Loudoun Dam.	Loudon	1790 ac	Low DO L PCBs L	Upstream Impoundment Contaminated Sediment	Fishing advisory due to PCBs. This stream is Category 5. The stream is impaired for one or more uses. Provides habitat for the federally listed fish, snail darter (Percina tanasi) and the following mussels: orange-foot pimpleback pearly mussel (Plethobasus cooperianus) and pink mucket pearly mussel (Lampsilis abrupta). TVA has attempted to mitigate dissolved oxygen issues below Fort Loudoun dam by injecting oxygen into the forebay.

Data Submitted for Consideration in the 2004 303(d) Assessment Process

Agency	Physical Data	Biological Data	Chemical Data	Bacteriological Data
US Army Corp of Engineers		X	X	
US Office of Surface Mining	X		X	
Tennessee Valley Authority	X	X	X	X
US Geological Survey	X	X	X	X
Tennessee Wildlife Resources Agency	X	X		

Examples of Contaminants

- Mercury (ref dose to hazard index) toxin to nervous system esp. in children
- PCB's (cancer slope factor to carcinogenic risk)
- Large Bioaccumulation Factors (~1 E4)
- Can be undetectable in water and sediment but still contaminant fishery

Mercury in Fish Tissue

- FDA Action Level 1.0 ppm
- EPA Criteria 0.3 ppm

Using a bioaccumulation factor back calculating to water conc. ~ 12 ppt

Methylization of metallic mercury is not understood

PCB's in Fish Tissue

- FDA action level 2.0 ppm
- EPA Non Cancer Endpoint 0.38 ppm
- EPA Cancer Endpoint 0.094 ppm
- EPA Potency Factor 2 per mg/kg-d (40 CFR Part 131) (FR Vol. 64 No. 216, Nov 9, 1999)

Calculation of the risk of additional cancers

(as per TDEC Rule 1200-4-3-.03)

$$R = q \times \frac{(C \times I \times X)}{W}$$

Where:

R = Plausible upper limit risk of cancer
R = 10-4 for typical consumers
R = 10-5 for atypical consumers

q = Carcinogenic Potency Factor

C = Concentration of chemical in the edible portion of the species

I = Mean daily consumption (0.0065 kg/day)

X = Relative absorption coefficient (usually 1 unless otherwise noted)

W = Average human mass (75 kg)

EPA Cancer Potency Factors

PCB = 2.0 (for ingestion of fish)
Arsenic = 1.5 (for ingestion of fish)


Custom

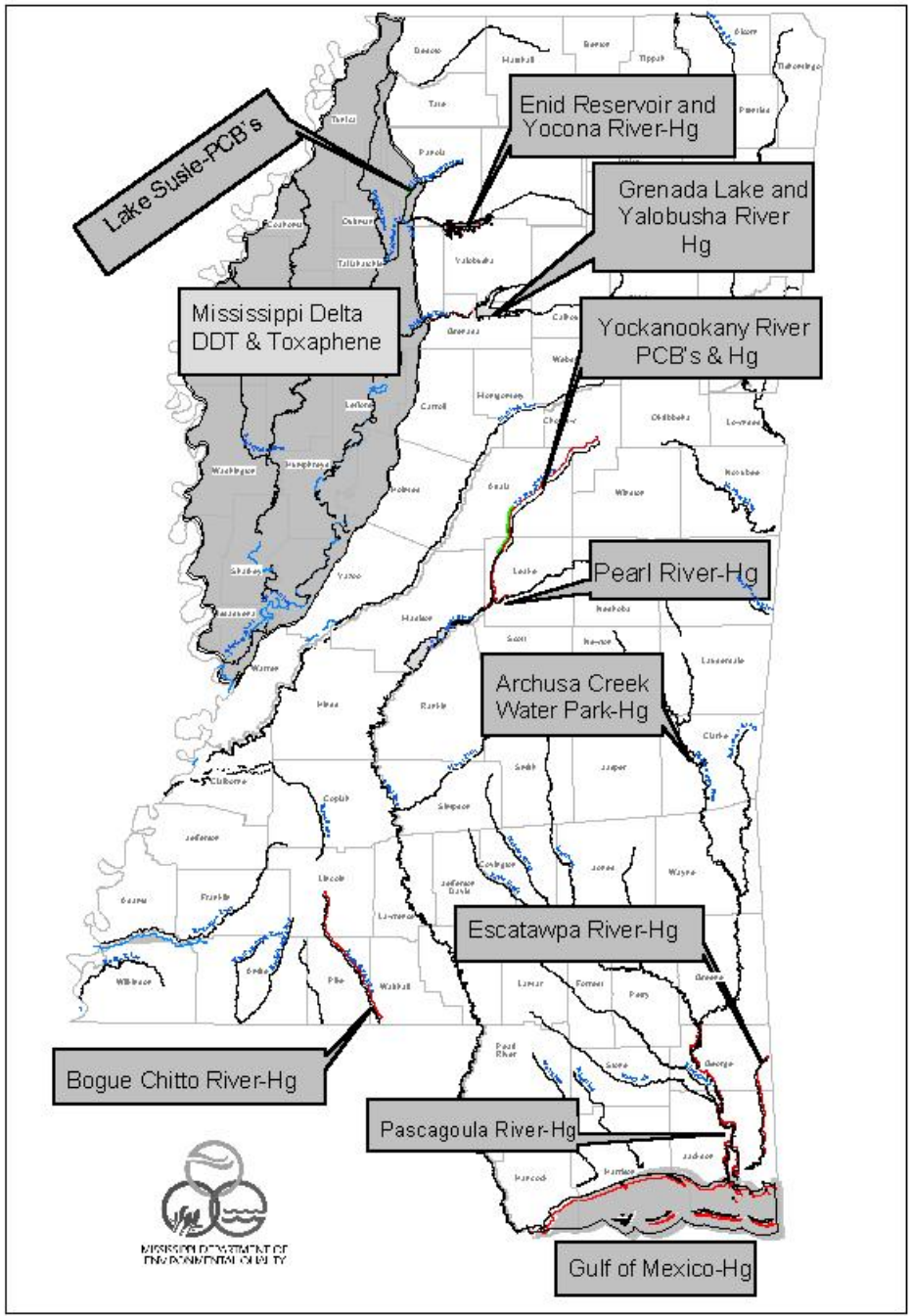
Current Fish Advisories

Stream	County	Portion	Pollutant	Comments
East Tennessee				
Boone Reservoir	Sullivan, Washington	Entirety	PCBs, chlordane	Precautionary advisory for carp and catfish.*
Chattanooga Creek	Hamilton	Mouth to GA line	PCBs, chlordane	Fish should not be eaten. Avoid contact with water also.
E. Fork of Poplar Creek, incl. Poplar Creek embayment	Anderson, Roane	Mile 0.0-15.0	Mercury, PCBs	Fish should not be eaten. Avoid contact with water also.
Fort Loudon Reservoir	Loudon, Knox, Blount	Entirety (46 miles)	PCBs	Commercial fishing for catfish prohibited by TWRA. Catfish, largemouth bass over two pounds, or any largemouth bass from the Little River embayment should not be eaten.
Melton Hill Reservoir	Knox, Anderson	Entirety	PCBs	Catfish should not be eaten.
Nickajack Reservoir	Hamilton, Marion	Entirety	PCBs	Precautionary advisory for catfish.*
N. Fork Holston River	Sullivan, Hawkins	Mile 0.0-6.2	Mercury	Fish should not be eaten. Advisory goes to TN/VA line.
Tellico Lake	Loudon, Monroe	Entirety	PCBs	Catfish should not be eaten.
Watts Bar Reservoir	Roane, Meigs, Rhea, Loudon	TN River portion	PCBs	Catfish, striped bass, and hybrid striped bass should not be eaten. Precautionary advisory* for sauger, carp, smallmouth buffalo, white bass, and largemouth bass.
Watts Bar Reservoir	Roane, Anderson	Clinch River arm	PCBs	Striped bass should not be eaten. Precautionary advisory for catfish and sauger.*
Middle Tennessee				
Woods Reservoir	Franklin	Entirety	PCBs	Catfish should not be eaten.
West Tennessee				
Loosahatchie River	Shelby	Mile 0.0-20.9	Chlordane	Fish should not be eaten.
McKellar Lake	Shelby	Entirety	Chlordane	Fish should not be eaten
Mississippi River	Shelby	MS line to mile 745	Chlordane	Fish should not be eaten. Commercial fishing prohibited by TWRA.
Nonconnah Creek	Shelby	Mile 0.0-1.8	Chlordane	Fish should not be eaten. Advisory ends at Horn Lake Road bridge.
Wolf River	Shelby	Mile 0.0-18.9	Chlordane	Fish should not be eaten.

* Precautionary Advisory: Children, pregnant women, and nursing mothers should not eat the fish species named. All other persons should limit consumption of the named species to one meal per month.

Mississippi Fish Advisories

July 2001



Browse by Category

Events Calendar, Notices and Announcements

Technical Guidance

Rules and Laws

Enforcement

Documents, Publications, and Forms

Browse by Program

Air

Water

Land

Hazardous Waste

Program Coordination

Other Links

Careers at Georgia EPD

Fish Consumption Guidelines

Fishing is a popular pastime in Georgia. Not only does fishing give people an excuse to get away from the hustle and bustle of daily life, bu
healthy satisfying meal on the table. Fish is low in saturated fat, high in protein, and can have substantial health benefits when eaten in p
foods. The quality of sport fish caught in Georgia is very good; however, low levels of some chemicals have been found in some fish. To hel
health of Georgians, the Georgia Department of Natural Resources has developed guidelines for how often certain species of fish can be sa
Mar 2001]

- Guidelines for Eating Fish from Georgia Waters, 2006 Update
- Recommendations for a Fish Tissue Monitoring Strategy [Revised 1992]
- Appendicies to Recommendations for a Fish Tissue Monitoring Strategy [Revised 1992]
- A Woman's Guide for Eating Fish from Coastal Georgia [Revised Nov 2003]
- A Woman's Guide for Eating Fish from Coastal Georgia *en Español* [Revised Nov 2003]
- A Woman's Guide for Eating Fish from the Coosa, Etowah and Oostanaula Rivers [Revised Nov 2003]
- A Woman's Guide for Eating Fish from the Coosa, Etowah and Oostanaula Rivers *en Español* [Revised Nov 2003]
- A Woman's Guide for Eating Fish from North Georgia [Revised Nov 2003]
- A Woman's Guide for Eating Fish from North Georgia *en Español* [Revised Nov 2003]
- A Woman's Guide for Eating Fish from Central and South Georgia [Revised Nov 2003]
- A Woman's Guide for Eating Fish from Central and South Georgia *en Español* [Revised Nov 2003]

For More Information...

GA Division of Public Health
Chemical Hazards Program
http://www.ph.dhr.state.ga.us
Phone: (404) 657-6534

The University of Georgia
Cooperative Extension Service
College of Family and Consumer Sciences
http://www.gafamilies.com
Phone: (706) 542-8866

GA Department of Natural Resources
Environmental Protection Division
http://www.dnr.state.ga.us/dnr/environ
Phone: (706) 369-6376 or (404) 656-4713

To receive a copy of the complete "Guidelines for Eating Fish from Georgia Waters," contact GA EPD or visit:
http://www.dnr.state.ga.us/dnr/environ

Supported in part by funds from the Comprehensive Environmental Response, Compensation, and Liability Act trust fund through a cooperative agreement with the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.

A Woman's Guide to Eating Fish From The Coosa, Etowah, and Oostanaula Rivers

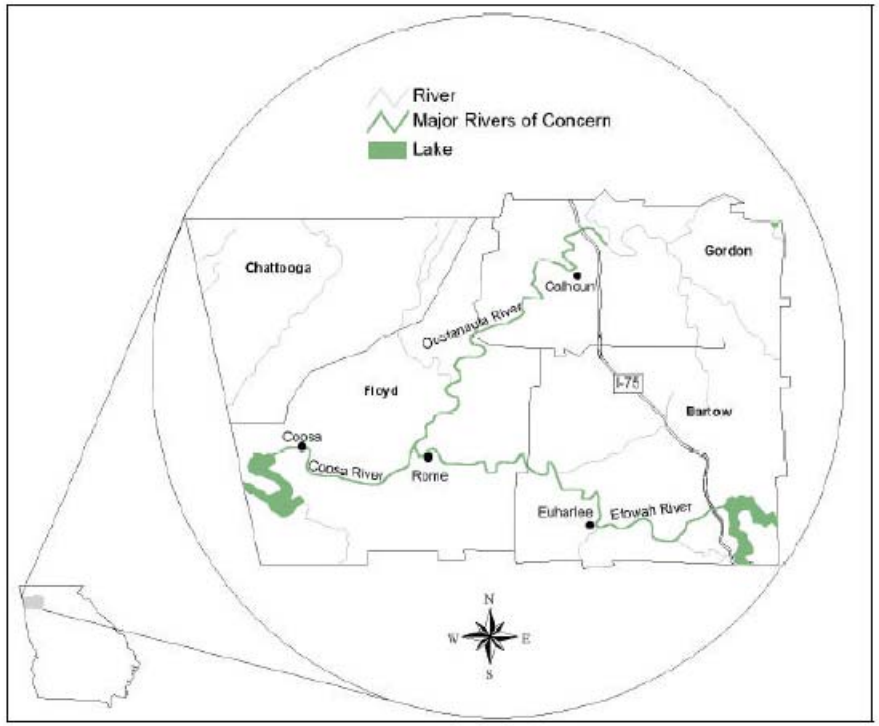
What you should know if you are pregnant, planning to be pregnant, or nursing a child

DHR
Georgia Department of Human Resources

The University of Georgia
Cooperative Extension Service
College of Family and Consumer Sciences

Department of Natural Resources
Environmental Protection Division

Coosa River Basin Fish Consumption Guidelines for Nursing and Pregnant Women, and Children



How to Read this Map

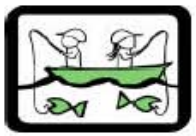
The areas of most concern are the Coosa River, and the Etowah and Oostanaula Rivers west of I-75. Women who are pregnant or nursing, or may become pregnant, and children under seven should not eat more than one (1) meal each month of fish caught in these rivers.

Remember--

The contaminants of greatest concern are PCBs; therefore, when you eat fish from these rivers, you should eat panfish such as sunfish and crappie. Try to eat fewer fish high in fat including catfish, sucker, and carp to reduce your exposure to PCBs.

The Benefits of Eating Fish and Seafood

Fish and seafood are excellent sources of protein, minerals, and vitamins, and play a role in maintaining a healthy, well-balanced diet. Fish is also an excellent source of Omega-3 fatty acids, which are essential for the development of a healthy baby. According to the American Heart Association, Omega-3 fatty acids in fish and seafood are also essential for good cardiovascular health for adults.



Concerns About Eating Fish and Seafood

Some fish contain contaminants, such as mercury or polychlorinated biphenyls (PCBs) that can be harmful if you eat them too often.

Over time, your body may build up harmful levels of toxic chemicals that can affect your pregnancy and the health of your baby.

Contaminated fish may not look, smell, or taste different, but they can still harm you and your child. Women who are or may become pregnant should contact their local health department or the Georgia Environmental Protection Division for more detailed information.

Frequently Asked Questions about Eating Fish from the Coosa River Basin

Q. Are fish from the Coosa River Basin safe to eat?

A. Yes, in most instances. However, some types of fish may contain contaminants that are a concern for pregnant women and young children. Women who are pregnant or nursing, or may become pregnant, and children under seven should follow the general recommendations on the map and choose fish that are likely to contain minimal amounts of contaminants.

Q. Which types of fish are most likely to have high levels of contaminants and which types are likely to have low levels?

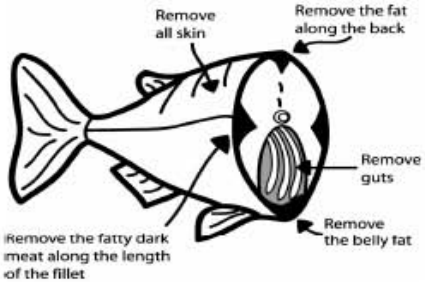
A. The following chart lists species that typically contain higher levels of contaminants and species that typically contain lower levels. Also, keep in mind that larger fish usually have higher contaminant levels than smaller fish. For example, a 12" largemouth bass will usually be much safer to eat than a 16" largemouth bass from the same body of water.

Higher Risk Species	Lower Risk Species
Largemouth Bass	Bream
Hybrid Bass	Sunfish
Striped Bass	Crappie
White Bass	Panfish
Pickerel	Trout
Carp	
Gar	
Catfish	
Suckers	

Q. What can I do to protect myself and my child from chemicals found in fish?

A. Follow the suggestions below:

- Eat safer types of fish and seafood
  - Eat a variety of fish and seafood
  - Avoid eating fish and seafood known to have high levels of contamination
- Find safer ways to prepare fish and seafood
  - Before cooking, remove organs, skin and fat as shown in the diagram below
  - Cook the fish in a way that the fat can drip away from the fish, such as grilling
  - Avoid deep frying fish and seafood
- Limit how much fish and seafood you eat
  - Nationally, the U.S. Food and Drug Administration (FDA) recommends that pregnant women should eat only a couple of servings of fish and seafood each week
  - Follow the guidelines in this brochure when eating locally caught fish in your area



What About Store Bought Fish?

Fish and seafood can contain trace amounts of contaminants; fish sold in stores and restaurants are no exception. However, smaller, non-predatory fish generally contain less mercury.

Based on reports from the FDA, fish and seafood should be part of a balanced diet for pregnant women. However, some long-lived, large fish such as **shark, swordfish, king mackerel,** and **tilefish** may contain high mercury concentrations and should not be eaten. FDA recommends eating a couple of servings of fish each week, and suggests a variety of store bought fish such as shellfish, canned fish, smaller ocean fish or farm raised fish.

Generally Safe Fish to Eat

Commercial fish and seafood such as flounder, pollock, cod, salmon, shrimp, clams, scallops, oysters, mussels, and farm raised fish, such as catfish, generally are safe to eat.

Para más información...

GA Division of Public Health
Chemical Hazards Program
www.ph.dhr.state.ga.us
Teléfono: (404) 657-6534

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En cooperación con University of Georgia, Ft. Valley State University, el Departamento de Agricultura de los EE.UU. y los condados del Estado. El Servicio de Extensión Cooperativa y el University of Georgia College of Agricultural and Environmental Sciences ofrece programas educativos, asistencia y materiales a todas las personas, sin discriminación por raza, color, nacionalidad, sexo o discapacidad.

Esta organización practica una política de igualdad de oportunidades/ acción afirmativa.
Compromiso a un mano de obra diversa

Folleto No. FDNS-E-SP-94-3 **Noviembre de 2003**

Emitido de acuerdo con el trabajo realizado por el Servicio de Extensión Cooperativa, según las Leyes del 8 de marzo y 30 de junio de 1914, con la cooperación de University of Georgia College of Agricultural and Environmental Sciences y el Departamento de Agricultura de los EE.UU.

Gale A. Buchanan, Decano y Director

Para recibir una copia completa de las "Pautas para el consumo de pescado de las aguas de Georgia", contáctese con GA EPD o visite:
www.gadnr.org

Financiado en parte por el fondo fiduciaro de la Ley Comprensivo Respuesta Ambiental Compensación, y

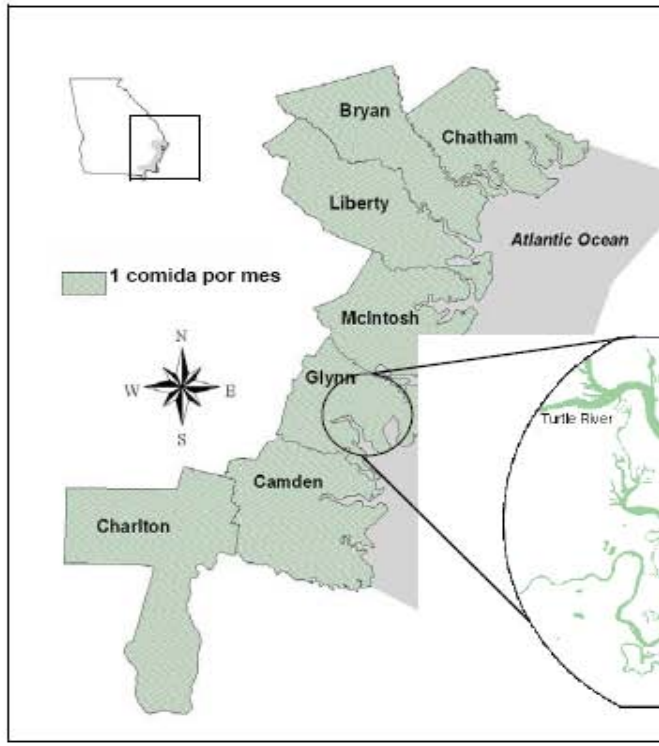
GUÍA PARA LAS MUJERES QUE COMEN PESCADO Y MARISCOS EN COSTA DE GEORGIA

Lo que Ud. debe saber si está embarazada o quiere quedar embarazada, o si está amamantado a un niño

DHR
Georgia Department of Human Resources

The University of Georgia
Cooperative Extension Service

Pautas para el consumo de pescado y mariscos
para las mujeres embarazadas, o en estado de



Cómo leer este mapa

Localice, en el mapa anterior, el condado donde usted vive y pesca. Las mujeres que están embarazadas o amamantando,

Recue

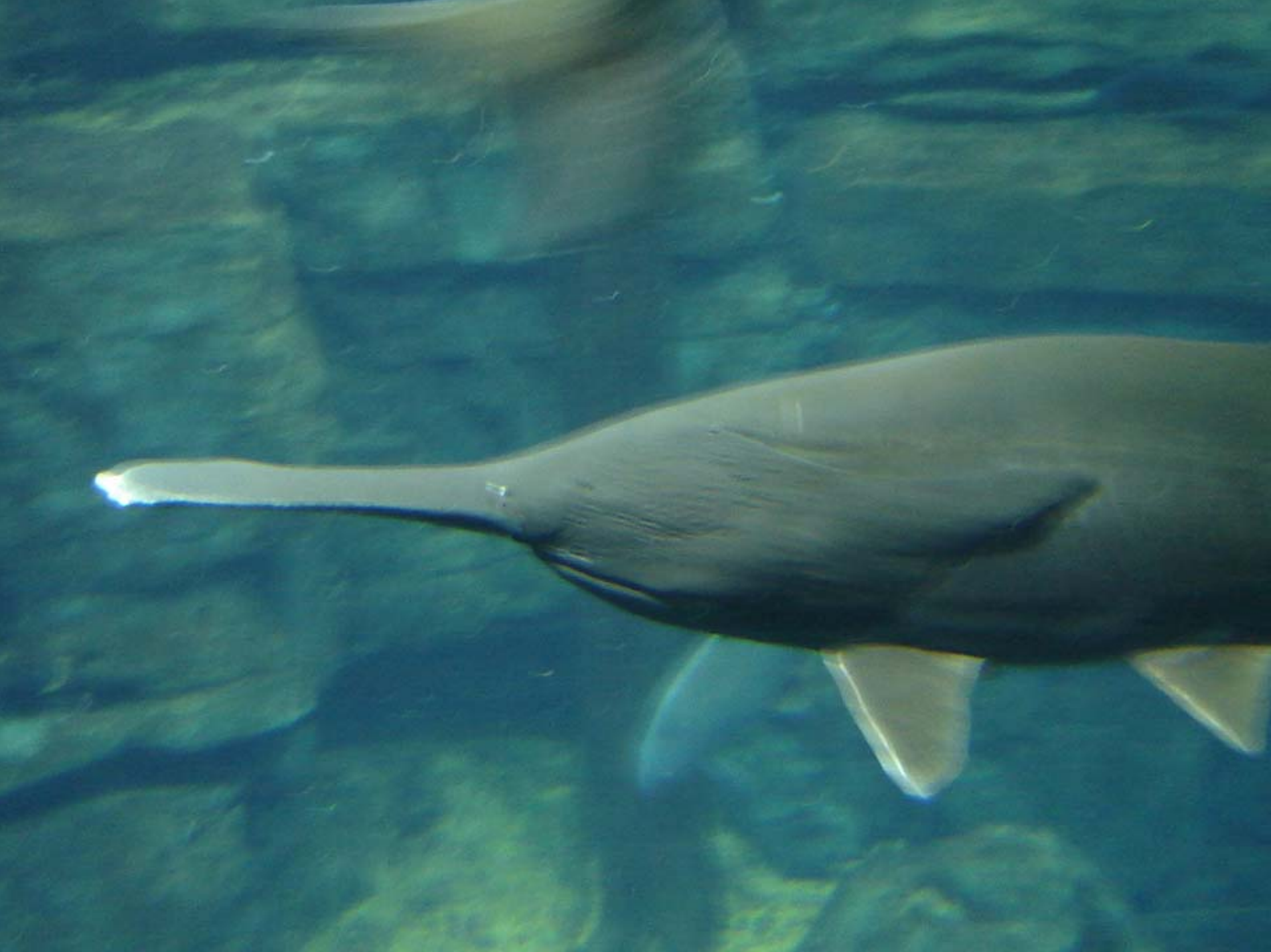
Algunos tipo
altos niveles
consumidos

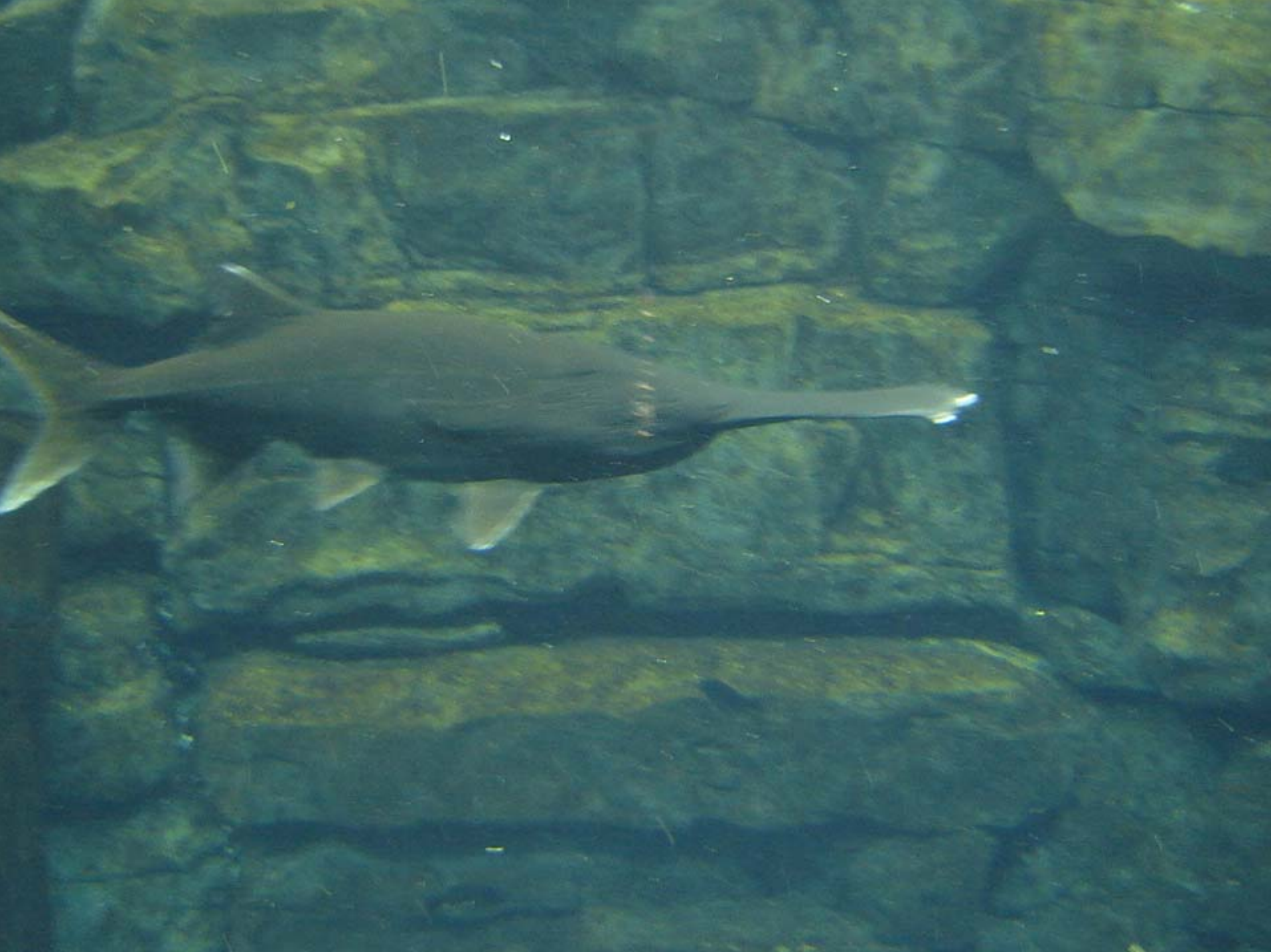

ring Racing on
il 22 – 23 • April 29
e 26–29 • August 5
WARNING!
CATFISH
from this body of water contain contaminants
at levels thought to increase the risk of
cancer or other illness in humans.
THESE FISH SHOULD NOT BE EATEN.
Tennessee Department of Environment and Conservation
CAUTION
Cables

Fishery Biology

- Enough so that you can communicate with an actual Fishery Biologist
- Fisheries Management, different Agency than Environmental Work usually.
- Age and Growth, Condition, Community Assessment, Health Indicators, of Fish
- Help communicate the advisory
- Experts in fish behavior and life history

- Electrofishing - use of electricity to:
  - capture fish
  - guide fish
  - block the movement of fish



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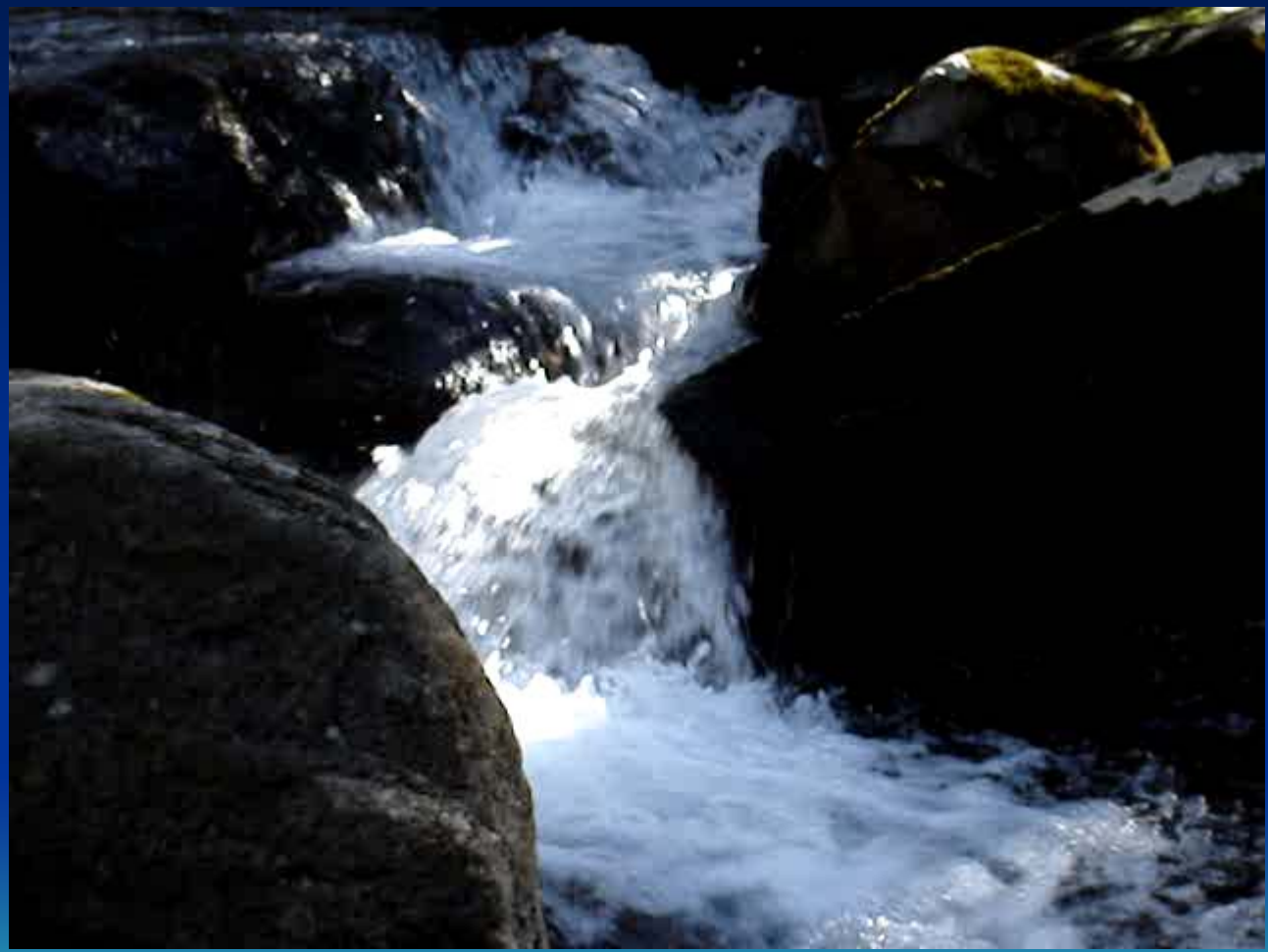

Natural Resource Damages

- Injury to fisheries
- Sport and commercial
- Recreational
- Loss of Resource
- Way of life impacted
- Damages can be calculated

NRDA and DOE in Tennessee

- State determined injury and damages to Lower Watts Bar Reservoir due to PCB contamination in fisheries.
- Responsible Party DOE
- Partial compensation was to provide the state a conservation easement to 3000 acres of undeveloped forest land.

EPA Resources

- Here are some links to EPA pages that talk about fish advisories.
-
- http://www.epa.gov/waterscience/criteria/methylmercury/
-
- http://www.epa.gov/ost/fish/chemfacts.html
-
- http://map1.epa.gov/html/newsletter.htm
-
- http://www.epa.gov/ost/fish/guidance.html
-
- http://www.epa.gov/waterscience/fish/forum/